DOCKET FILE COPY ORIGINAL

COHEN, DIPPELL AND EVERIST, P. C.
CONSULTING ENGINEERS
RADIO-TELEVISION
1300 L STREET, N. W.
SUITE 1100
WASHINGTON, D. C. 20005

JULIUS COHEN
RALPH E. DIPPELL, JR.
DONALD G. EVERIST
SUDHIR K. KHANNA
WARREN M. POWIS
JOHN R. URAM, JR.
ROBERT W. GUILL
WILSON A. LA FOLLETTE

TELEPHONE
(202) 898-0111
TELECOPIER
(202) 898-0895

April 5, 1993

Ms. Donna R. Searcy
Secretary
Federal Communications Commission
Room 222
1919 M Street, N.W.
Washington, D.C. 20554

Re: Comments on Notice of Proposed Rule Making, ET Docket No. 92-298

Dear Ms. Searcy:

Enclosed herewith are five copies (original and four) of the comments and audio tape (one for each copy of the comments) by this firm in the Notice of Proposed Rule Making, "Amendment of the Commission's Rules to Establish a Single AM Radio Stereophonic Transmitting Equipment Standard".

The audio tape provides recorded observations of AM stereo reception using three different receivers (Potomac Instruments, Sony, and the Denon "Super Tuner"). The observations were taken in various locations to simulate actual conditions experienced by the typical AM radio listener.

If there are any questions, please do not hesitate to contact this office.

Sincerely,

COHEN, DIPPELL AND EVERIST, P.C.

Donald G. Everist
President

DGE:mcw
Enclosure

No. of Copies rec'd 0+4
List A B C D E

ENGINEERING STATEMENT
ON BEHALF OF
COHEN, DIPPELL AND EVERIST, P.C.
RE NOTICE OF PROPOSED RULE MAKING
ET DOCKET 92-298; FCC 92-546
APRIL 1993

COHEN, DIPPELL AND EVERIST, P.C.
CONSULTING ENGINEERS
RADIO AND TELEVISION
WASHINGTON, D.C.

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
Establishment of a Stereophonic	)	
Transmitting Standard in the	)	ET Docket No. 92-298
Radio Broadcasting Service	)	FCC 92-546

COMMENTS BY COHEN, DIPPELL AND EVERIST, P.C. OF NOTICE OF PROPOSED RULE MAKING

Introduction

The comments are submitted by Cohen, Dippell and Everist, P.C. Consulting Engineers ("CDE") in response to the above captioned proceeding ("NPRM")[1/]. CDE and its predecessors have practiced and have represented the broadcast industry before the Federal Comunications Commission ("Commission") for more than fifty (50) years.

CDE has carefully reviewed the Commission's NPRM which seeks to adopt a stereophonic standard. The Commission is to be further commended for its efforts to improve the AM service. We believe that stereophonic operation can be an important tool in its effort to achieve "parity" with the FM aural broadcasting service.

1/ [illegible]

Last year, CDE filed information regarding stereophonic operations. An audio recording was offered in the Petition for Reconsideration MM Docket 87-267 ("Petition") which provided examples of typical environmental conditions encountered when the consumer listens to this service in a rural home environment from three AM stations at different signal levels in both monophonic and stereophonic modes. In addition, a recording was provided at three AM signal levels in three rural locations which compares AM stereo (normal and wideband) with FM stereo.[2/] These tapes are being resubmitted for convenience. In addition, these observations have been supplemented in 1993 by selecting a site whose environment is subject to greater man-made noise. We believe this tape recording offers strong evidence that AM sterephonic operation can be comparable to FM stereophonic transmissions and that based upon these limited observations[3/] that a higher signal strength is required to provide that quality.

Daytime Service Contour Class B Station

Now the Commission has raised an important factor in the consideration of adopting a stereo standard. CDE believes that the Commission by adopting a standard, it must also consider the signal strength necessary to provide quality stereo reception. In the Petition, CDE submitted that an analogous example was FM stereo reception at the once-recognized 0.050 mV/m monophonic contour was not practical. Subsequently, the FCC deleted that contour

daytime service for the Class B stations[4] is impractical in delivering technical AM stereo quality competitive with FM stereo now that an AM stereo standard is to be adopted. Selection of a higher daytime service contour for the Class B[5] station will balance and complement the new stricter interference ratio with an enhanced service concept.

Also in the Petition, CDE performed daytime listening tests in the home using the Potomac Instrument SMR-11[6] stereo monitor. It was observed that the AM stereo signal, having a value around 0.5 mV/m for the regional station is susceptible not only to receiver mixer noise, but to electronic devices indigenous to the home, not common twenty years ago. These devices include light dimmers, fluorescent high efficiency light bulbs, computers, etc. It was further observed that noise is exacerbated when trying to receive in the stereo mode. Recordings[7] were made to demonstrate these conditions and were a part of that Petition. In addition, recordings of an AM stereo station at three signal levels (0.61, 1.15 and 2.15 mV/m) were performed in normal and wideband stereo modes. In 1993, recordings of AM signals in

---

[4] CDE believes this opportunity only exists for Class B stations since by birthright Class A and Class C stations historically filled a different role in delivering AM service. It is noted that over 40% of the broadcast stations population are Class B stations.

[5] It is noted that the Petition for Reconsideration for Docket 87-267 is still awaiting Commission action.

[6] Special acknowledgement is made to Potomac Instruments for providing the AM stereo monitor.

[7] Special acknowledgement to stations Chase Broadcasting, former licensee of WTOP and Greater Media, licensee of WWRC for providing professional quality recording and transcribing equipment and other support.

a business (downtown) environment at two signal levels 1 mV/m and 2 mV/m) were also performed in the narrow and wideband stereo modes.

Therefore, based upon these observations, at relatively rural locations and from downtown Washington, DC, we believe it prudent that the Commission adopt a higher signal level[1/] for both the existing band as well as the expanded band.[2/] A convergence of desired receiver field strengths for satisfactory AM stereo reception on three different receivers requires signal levels well in excess of the current 0.5 mV/m standard. We are providing this tape as a part of this submission. The reason is quite simple as demonstrated by the tape, AM is technically competitive with FM when a sufficient AM signal is delivered to operate in the wideband stereo mode. CDE believes based upon these observations that AM signal must be 1.0 mV/m or greater.

To correlate those observations with a typical Class B allocation situation additional studies are being performed. On the existing band, a study has been performed on 1260 kHz. Stations surrounding WWDC, Washington, DC and WNRK, Newark, Delaware on 1260 kHz and their first adjacent channels, 1250 kHz and 1270 kHz have been studied. WWDC is licensed to a city with more than 500,000 persons and WNRK is licensed to a community with less than 30,000 persons. Figures 1 through 10 provide a summary of those allocation studies.

Figure 1 shows the co-channel allocation situation based on existing powers and the groundwave contours of 0.5 mV/m and the interfering 0.025 mV/m contours.

Figure 2 shows the same stations at the same power level; however, the 1.0 mV/m and interfering 0.050 mV/m contours are shown.

Figure 3 depicts the daytime first-adjacent 0.5 and 0.25 mV/m contours.

Figure 4 shows the first-adjacent channel relationship of the 1.0 and 0.5 mV/m contours.

Figure 5 shows the daytime co-channel allocation situation based upon a fifty (50%) percent increase in power for all stations and the resultant 1.0 and 0.050 mV/m groundwave contours.

Figure 6 shows the first-adjacent channel allocation based on a fifty percent (50%) increase in power for all stations utilizing the 1.0 and 0.5 mV/m contours.

Figure 7 provides the co-channel allocation situation based on all stations increasing power by one hundred percent (100%) and utilizing the 0.050 and 1.0 mV/m contours.

Figure 8 shows the daytime first-adjacent channel situation with all stations operating with a power increase of one hundred percent (100%) using the 1.0 and 0.5 mV/m contours.

Figure 9 shows the multitude of FM service in the area.

Figure 10 provides an article from the *Washington Post* which details a report on the population shift from rural to the urbanized areas.

By increasing the daytime power and selecting the 1.0 mV/m (or greater) contour rather than 0.5 mV/m contour as the protected contour and using the protection ratios adopted in the R&O, the resultant population gain based upon the 1990 Census is as follows:

STATION	POWER	1990 POPULATION	1 MV/M POPULATION GAIN REFERENCED TO LICENSED
WWDC	LICENSED (5 KW)	3,045,601	—
WNRK	LICENSED (1 KW)	393,943	—
WWDC	7.5 KW	3,326,782	281,181 (9.2% GAIN)
WNRK	1.5 KW	454,588	60,645 (15.4% GAIN)
WWDC	10.0 KW	3,534,340	444,739 (16.0% GAIN)
WNRK	2.0 KW	501,688	107,745 (27.4% GAIN)
Population Count Includes Urban Areas and Towns of 25,000 or Greater Outside the 2 mV/m Contour			

As seen from the above example, a dramatic population increase of a high quality stereo AM signal can result when the 1.0 mV/m contour is used as the protected contour.

Figure 10 concludes that based on the 1990 Census over 50 percent of the population of the United States is located in metropolitan areas.[10] The article further notes that in 1950 that figure was less than 30 percent. This dramatic population shift demonstrates the need for the Class B AM stations to serve these expanded metropolitan population areas.

obtained the consent of all stations which may be affected and the increase is consistent with the public interest. The FCC has reaffirmed that decision in the *Memorandum, Opinion and Order* adopted April 15, 1991. **CDE believes that a similar approach would be constructive and benefit AM stations seeking to achieve mutual improvements in their facilities.**

CDE believes that for Class B stations in the expanded and existing bands one aspect for the prescription for competitive technical quality is a redefined daytime service contour of 1.0 mV/m or greater[11/] with the interference ratios provided in the *Order* for existing stations.

Model 1 and Model 2 Carrier Frequency Tolerance

The Commission has left unaltered the frequency tolerance if stereophonic operation is adopted. CDE has received numerous reports that false stereo receiver indications can be a problem in certain conditions. One of those conditions appear to be traced to any two stations operating with a frequency difference that produce combinations at or near the pilot frequency. The receiver stereo pilot indicator reacts to this frequency difference such that it indicates the presence of stereo operation. This inadvertently triggers that portion of the receiver circuitry and thereby results in the introduction of wideband noise in certain receivers. The Commission should study whether the 20 Hz tolerance is contributing to this phenomena and if so whether the AM carrier frequency should be maintained to within 10 Hz. Therefore, the Commission is urged to adopt an appropriate carrier frequency tolerance.

[11/] A new broadcast station (transmission facility) would still be assigned based upon protection to the 0.5 mV/m contour.

In Docket 87-267 the Commission allowed Travelers Information Stations (TIS) to

APPENDIX I

FIGURES 1 THROUGH 10

JANUARY 1992

COHEN, DIPPELL AND EVERIST, P.C. CONSULTING ENGINEERS WASHINGTON, D.C.

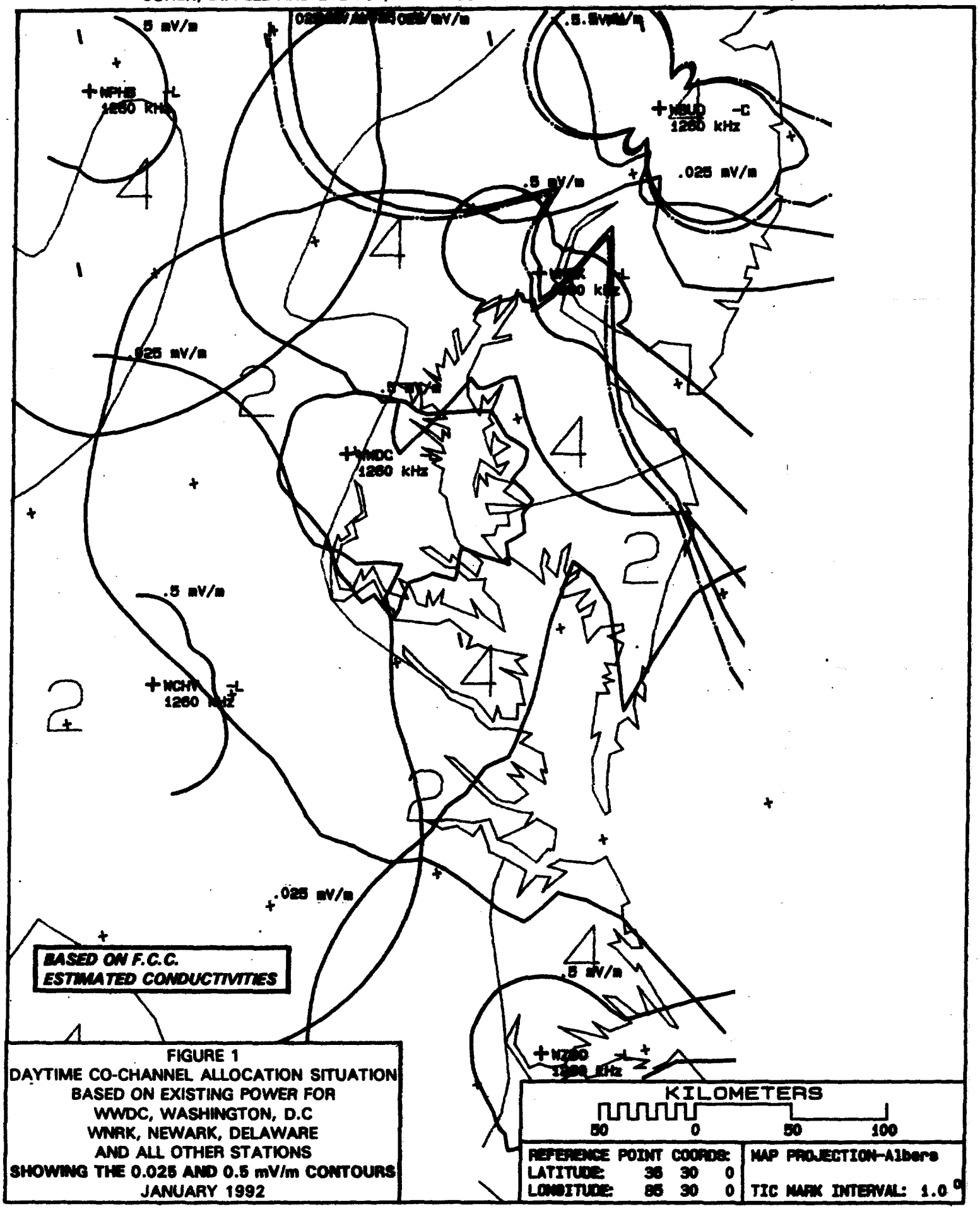
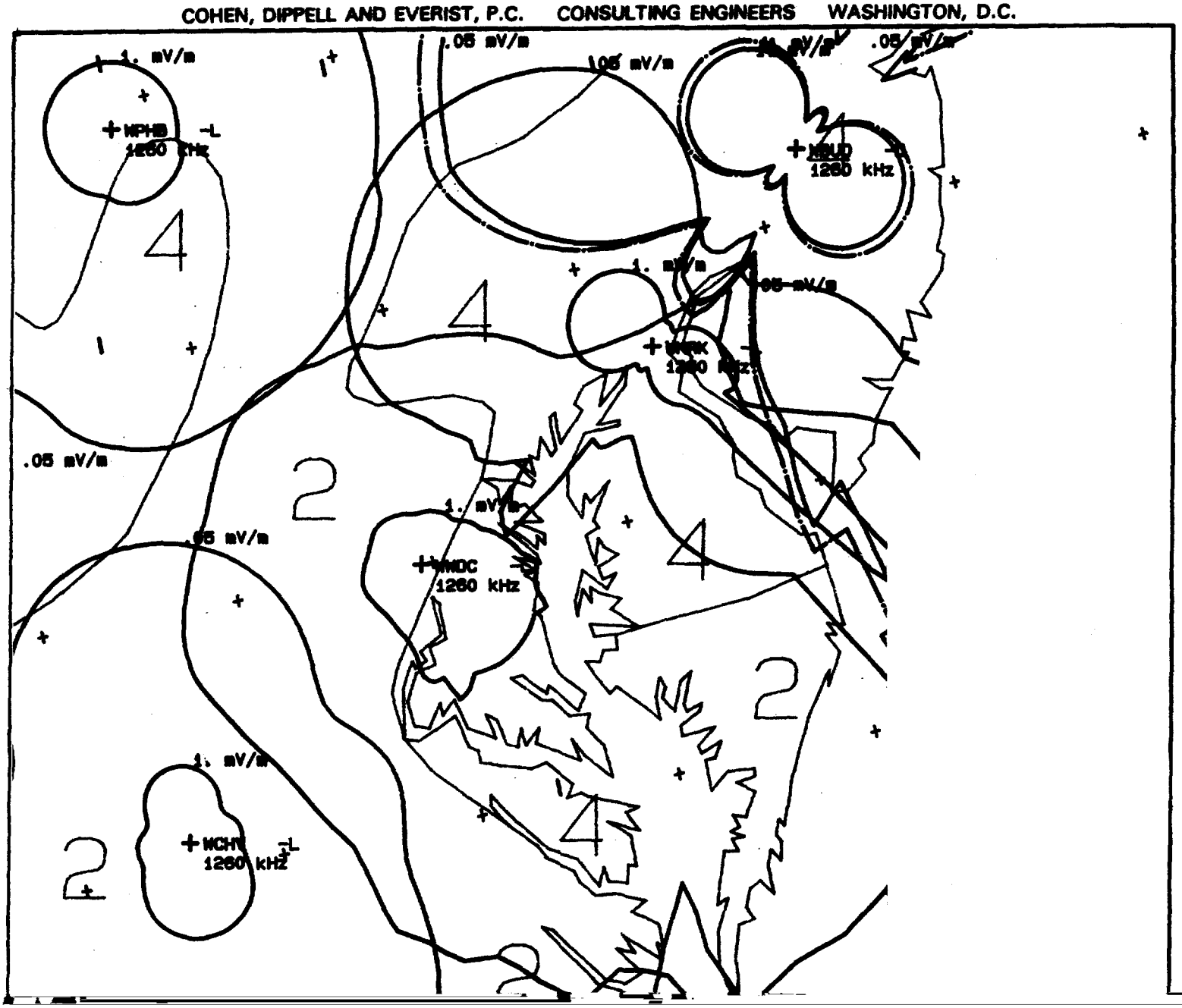
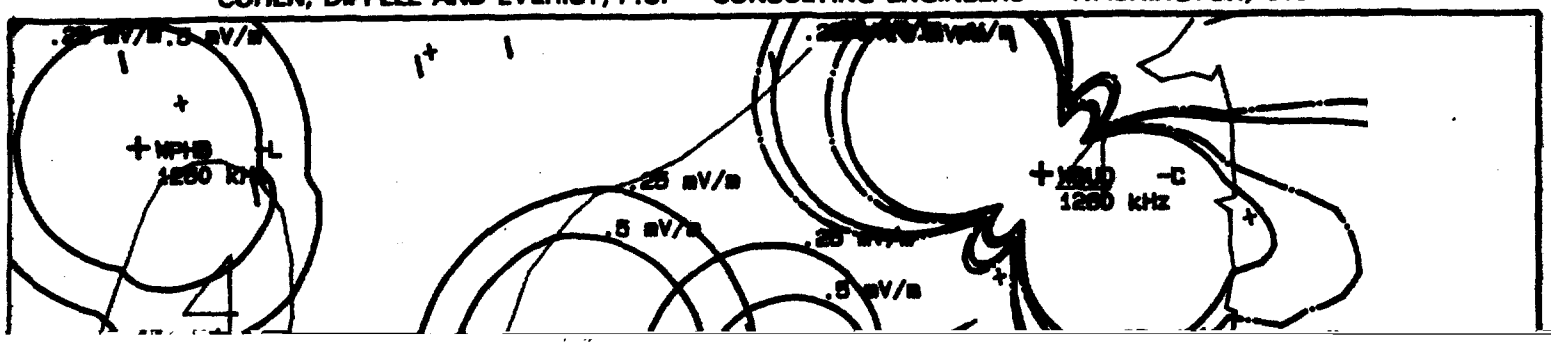


FIGURE 1
DAYTIME CO-CHANNEL ALLOCATION SITUATION
BASED ON EXISTING POWER FOR
WWDC, WASHINGTON, D.C
WNRK, NEWARK, DELAWARE
AND ALL OTHER STATIONS
SHOWING THE 0.025 AND 0.5 mV/m CONTOURS
JANUARY 1992


.05 mV/m
1. mV/m
WPHB
1260 kHz
-L
WBUD
1260 kHz
WMDC
1260 kHz
WCHN
1260 kHz
4
2
1


.25 mV/m
.5 mV/m
1250 kHz

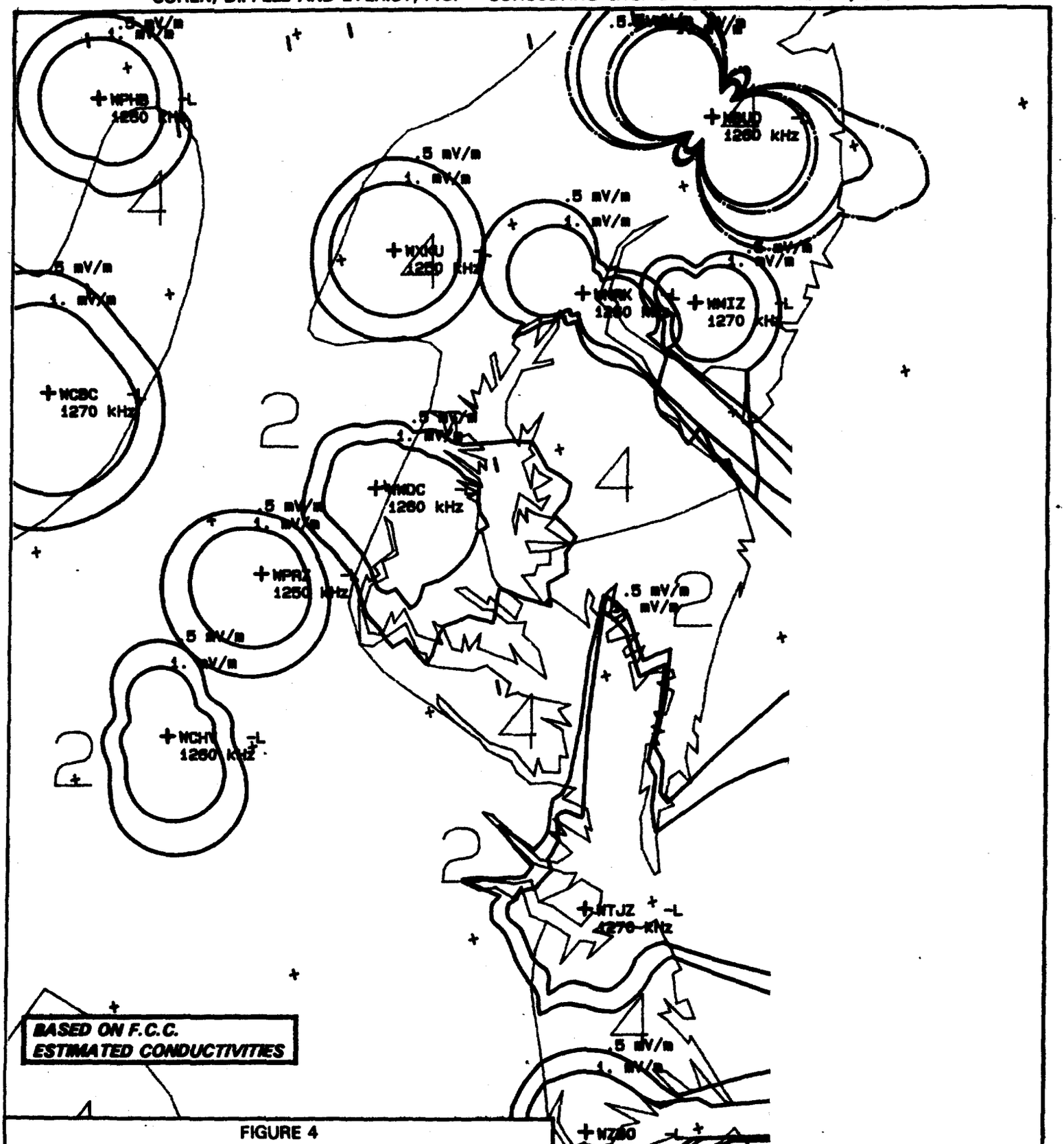


FIGURE 4
DAYTIME FIRST-ADJACENT CHANNEL ALLOCATION SITUATION
BASED ON EXISTING POWER FOR
WWDC, WASHINGTON, D.C.
WNRK, NEWARK, DELAWARE
AND ALL OTHER STATIONS
SHOWING THE 1.0 AND 0.5 mV/m CONTOURS
JANUARY 1992

COHEN, DIPPELL AND EVERIST, P.C. CONSULTING ENGINEERS WASHINGTON, D.C.

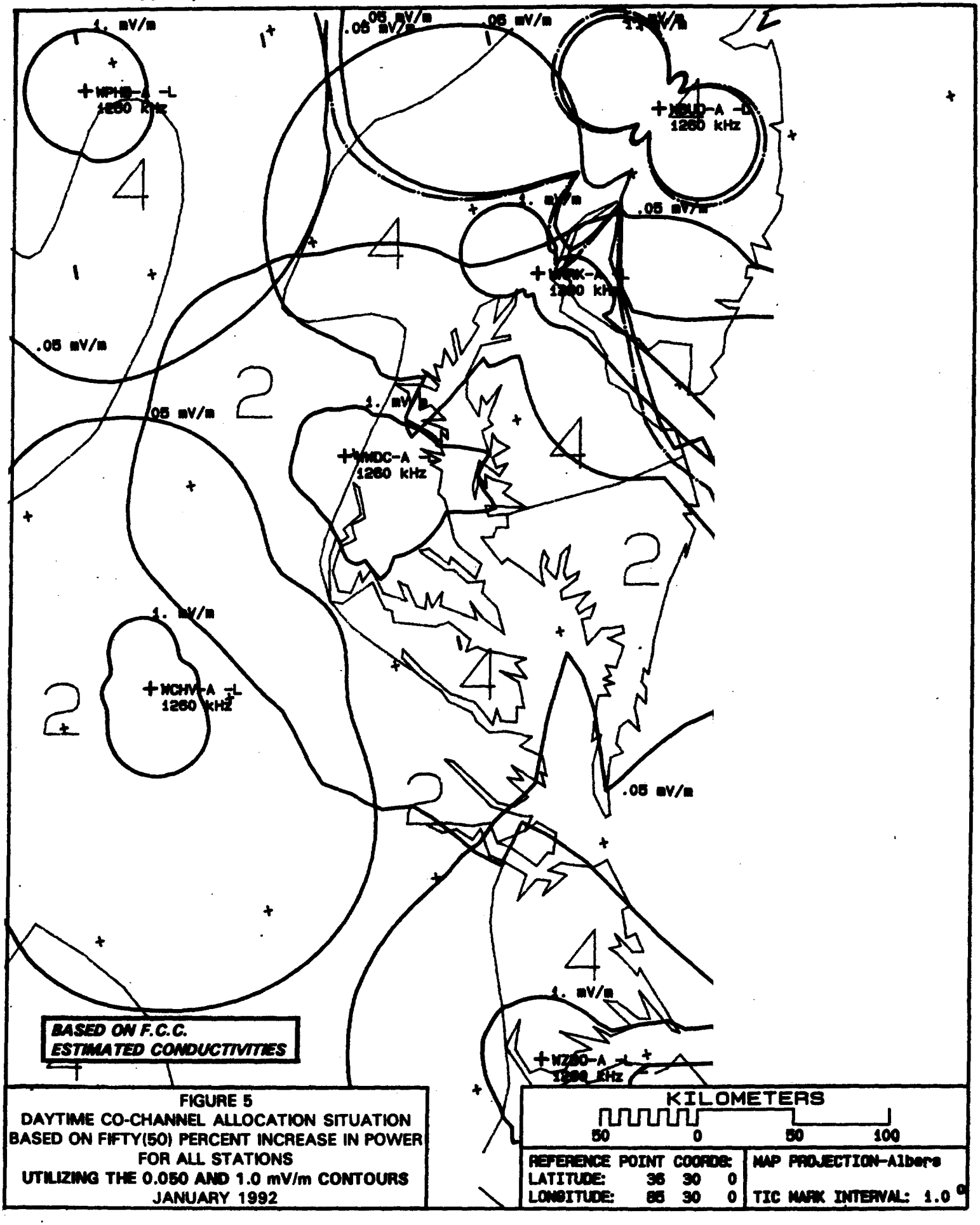
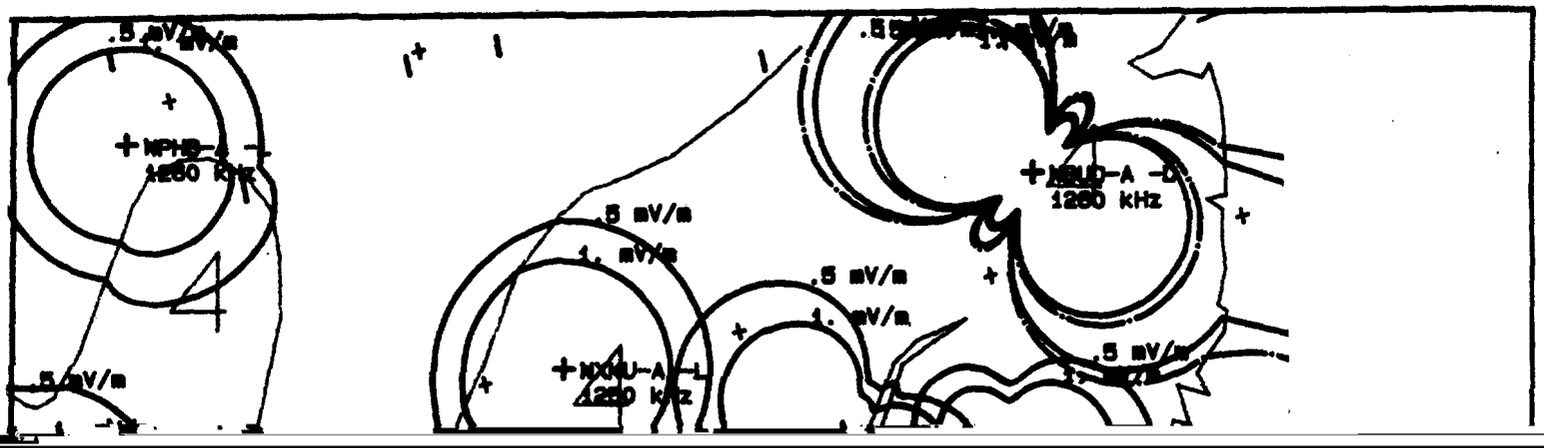


FIGURE 5
DAYTIME CO-CHANNEL ALLOCATION SITUATION
BASED ON FIFTY(50) PERCENT INCREASE IN POWER
FOR ALL STATIONS
UTILIZING THE 0.050 AND 1.0 mV/m CONTOURS
JANUARY 1992

REFERENCE POINT COORDS:				MAP PROJECTION-Albers
LATITUDE:	36	30	0	
LONGITUDE:	86	30	0	TIC MARK INTERVAL: 1.0


.5 mV/m
1260 kHz
.5 mV/m
1 mV/m
.5 mV/m
1 mV/m
.5 mV/m
1260 kHz

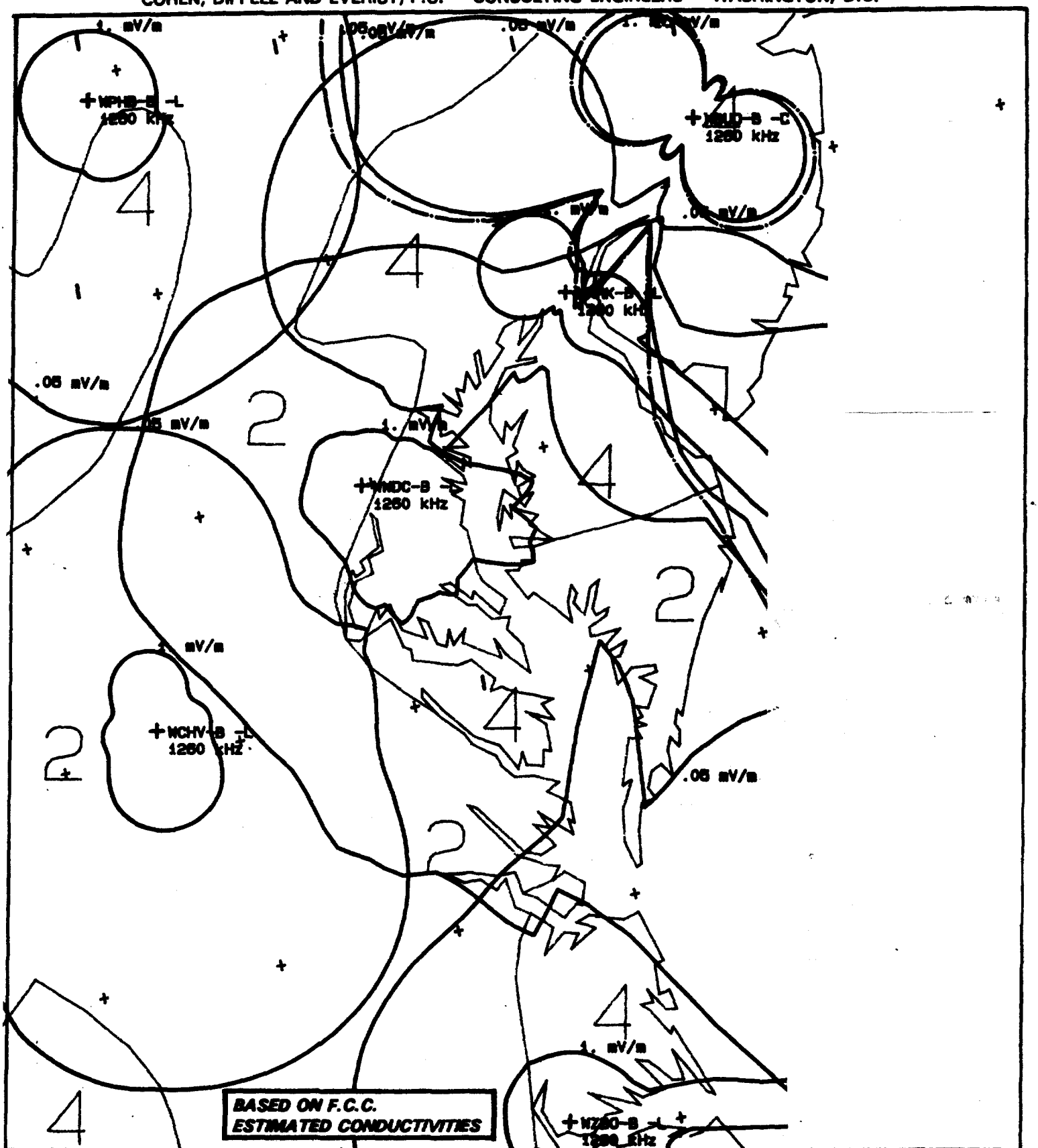
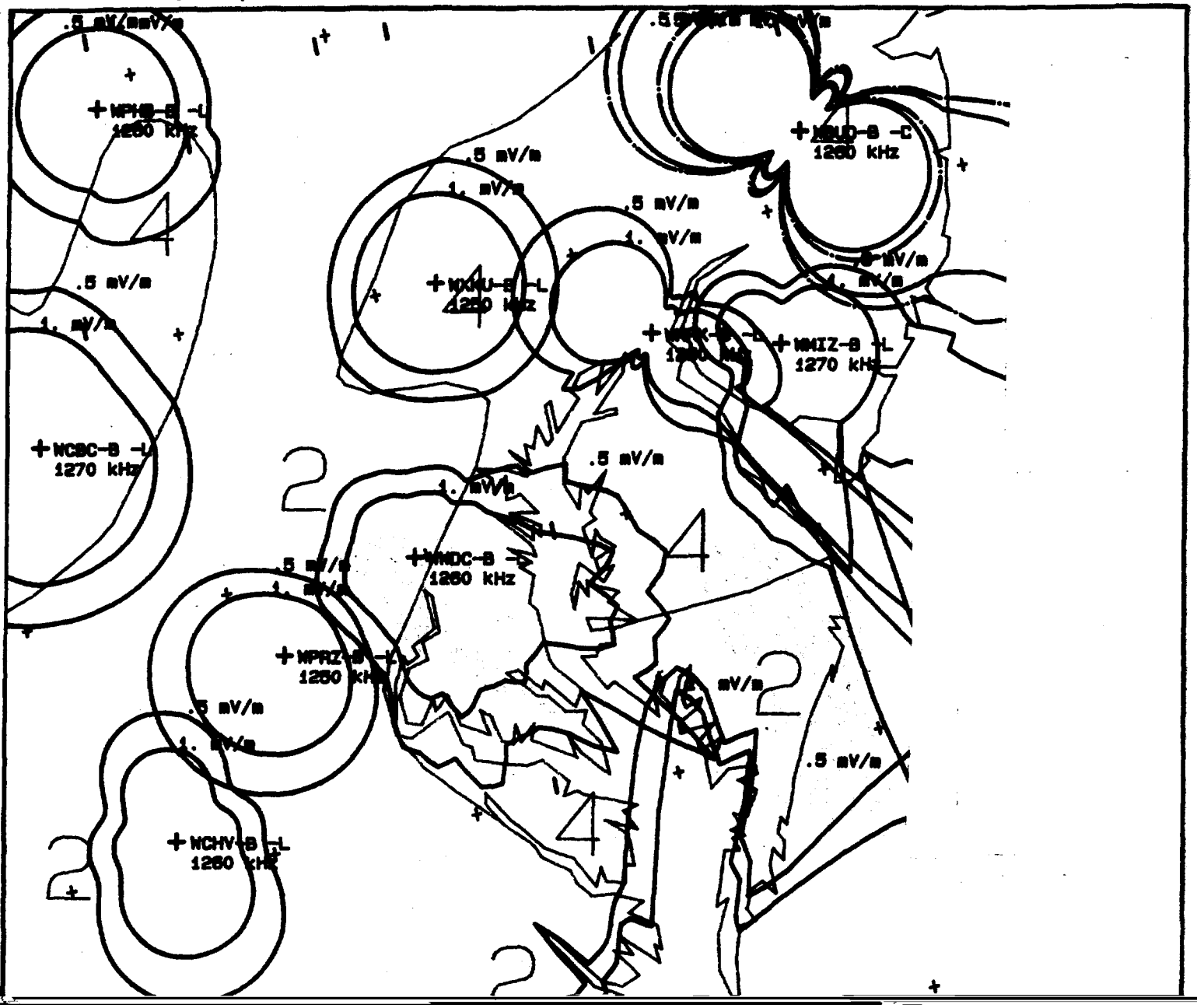
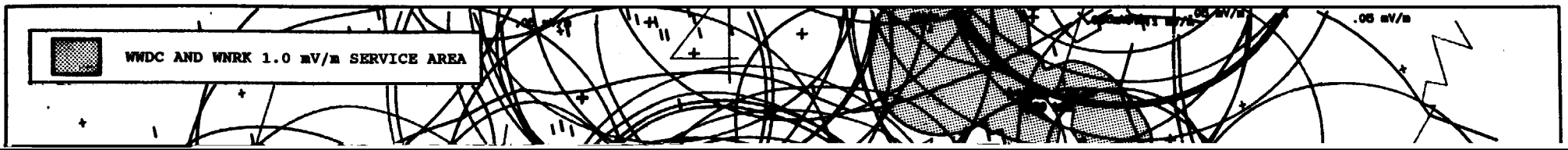


FIGURE 7
DAYTIME CO-CHANNEL ALLOCATION SITUATION
BASED ON ONE-HUNDRED(100) PERCENT INCREASE IN POWER
FOR ALL STATIONS
UTILIZING THE 0.050 AND 1.0 mV/m CONTOURS
JANAURY 1992

KILOMETERS
50 0 50 100

REFERENCE POINT COORDS:				MAP PROJECTION-Albers
LATITUDE:	36	30	0	
LONGITUDE:	86	30	0	TIC MARK INTERVAL: 1.0 °


.5 mV/m
1. mV/m
WMUD-B -C
1260 kHz
WMIZ-B -L
1270 kHz
WCBC-B -L
1270 kHz
WMDC-B
1260 kHz
WCHV-B -L
1260 kHz
2
4


WWDC AND WNRK 1.0 mV/m SERVICE AREA
.05 mV/m

The Washington Post FINAL

114TH YEAR .... No. 78 THURSDAY, FEBRUARY 21, 1991 25¢

Half of Population Lives in Urban Areas

Census Says People Drawn to Metropolises of 1 Million or More

By Barbara Vobejda
Washington Post Staff Writer

For the first time, more than half of the nation's population lives in big metropolitan areas, capping decades of American movement from small towns and farms to urban centers and the suburbs that have sprouted around them.

Figures from the 1990 census released yesterday showed that the fastest growing metropolises were in Florida—nine of the top 12—and the Southwest.

While metropolitan areas along the southern Atlantic and Pacific seaboards grew the fastest, the new figures also indicate that northern metro areas fared much better in the 1980s than they had in the previous decade.

"It's certainly different than the 1970s when there was a wholesale population loss . . . in the Snow Belt," said William Frey, a demographer at the University of Michigan. Despite the common prediction that the northern industrial areas would continue to suffer population declines, he said, "these figures show these large metro areas are making somewhat of a comeback."

Overall, the data confirm what demographers and earlier census results have shown: a dramatic shift in population from the Northeast and Midwest to the South and West. The figures on metropolitan areas point to another, simultaneous phenomenon: the concentration of more of the population into urban areas of at least a million population.

While less than 30 percent of the nation's residents lived in such metro areas in 1950, that number has grown steadily, moving from about 46 percent in 1980 to just more than 50 percent today.

See CENSUS, A12, Col. 1

POPULATION SHIFT

1950 LESS THAN 30% IN URBAN AREAS
1990 MORE THAN 50% IN URBAN AREAS

FIGURE 10
THE WASHINGTON POST ARTICLE
OF FEBRUARY 21, 1991
REGARDING POPULATION IN URBAN AREAS
JANUARY 1992

COHEN, DIPPELL and EVERIST, P.C. Consulting Engineers Washington, D.C.

Florida Home to 9 of 12 Fastest Growing Cities

CENSUS, From A1

"It's a significant threshold," said Richard Forstall, chief of the population distribution branch of the Census Bureau.

The trend reflects not only the consolidation of available jobs around urban areas, he said, but the momentum that continues to attract people to a growing community.

There were four newcomers in the group of areas with more than 1 million people: Charlotte, N.C., Salt Lake City, Orlando, Fla., and Rochester, N.Y. In some cases—Charlotte, for example—the population growth was at least partially because of the annexation of suburban territory.

The population of the Washington metropolitan area grew by 21 percent during the 1980s to 3.9 million people. It remains the eighth largest metro region in the country.

Among the most striking patterns revealed in the new figures was the extraordinary concentration of metropolitan growth in Florida, in communities dotting both of the state's coasts as well as two inland areas. To a large extent, experts said, this growth was fueled by retirees.

Florida's fast-growing metro areas include: Naples, which grew by 77 percent, Fort Pierce, 66 percent, Fort Myers, 63 percent, Ocala, 59 percent, Orlando, 53 percent, West Palm Beach, 50 percent, Melbourne-Titusville, 46 percent, Daytona Beach, 43 percent, and Bradenton, 43 percent.

Also among the fastest-growing areas in the nation were Las Vegas, at 60 percent, Austin, Tex., 46 percent and Las Cruces, N.M., at 41 percent.

The New York metropolitan area gained nearly 548,000 people, or 3 percent, remaining the largest in the country with 18 million. The second largest, Los Angeles, gained more than 26 percent, to 14.5 million.

The pattern of growth around Los Angeles reflected what demographers said was the significant expansion of suburban and "exurban" growth, the movement of residents farther outside a central city.

While the central city of Los Angeles grew by about 19 percent, it was far outpaced by its surburban communities, including Riverside-San Bernardino, up 66 percent.

"The spread of metropolitan areas well beyond the central cities has set up metropolitan systems," said Carl Haub, a demographer at the population reference bureau. "The cultural, social and economic effect can reach out far beyond the obvious."

These are the 39 metropolitan areas with 1 million people or more, according to 1990 Census Bureau figures released yesterday:

City	1980 Total	1990 Total	Percent Change
New York	17,539,532	18,087,251	3.1
Los Angeles	11,497,549	14,531,529	26.4
Chicago	7,937,290	8,065,633	1.6
San Francisco	5,367,900	6,253,311	16.5
Philadelphia	5,680,509	5,899,345	3.9
Detroit	4,752,764	4,665,236	-1.8
Boston	3,971,792	4,171,643	5.0
Washington	3,250,921	3,923,574	20.7
Dallas	2,930,568	3,888,415	32.6
Houston	3,099,942	3,711,043	19.7
Miami	2,643,766	3,192,582	20.8
Atlanta	2,138,136	2,833,511	32.5
Cleveland	2,834,062	2,759,823	-2.6
Seattle	2,093,288	2,559,164	22.3
San Diego	1,861,846	2,498,016	34.2
Minneapolis	2,137,133	2,464,124	15.3
St. Louis	2,376,968	2,444,099	2.8
Baltimore	2,199,497	2,382,172	8.3
Pittsburgh	2,423,311	2,242,798	-7.4
Phoenix	1,509,175	2,122,101	40.6
Tampa	1,613,600	2,067,959	28.2
Denver	1,618,461	1,848,319	14.2
Cincinnati	1,660,257	1,744,124	5.1
Milwaukee	1,570,152	1,607,183	2.4
Kansas City	1,433,464	1,566,280	9.3
Sacramento	1,099,814	1,481,102	34.7
Portland, Ore.	1,297,977	1,477,895	13.9
Norfolk	1,160,311	1,396,107	20.3
Columbus	1,243,827	1,377,419	10.7
San Antonio	1,072,125	1,302,099	21.5
Indianapolis	1,166,575	1,249,822	7.1
New Orleans	1,256,668	1,238,816	-1.4
Buffalo, N.Y.	1,242,826	1,189,288	-4.3
Charlotte, N.C.	971,447	1,162,093	19.6
Providence, R.I.	1,083,139	1,141,510	5.4
Hartford, Conn.	1,013,508	1,085,837	7.1
Orlando, Fla.	699,904	1,072,748	53.3
Salt Lake City	910,222	1,072,227	17.8
Rochester, N.Y.	971,230	1,002,410	3.2

COHEN, DIPPELL AND EVERIST, P. C.

APPENDIX II

SELECTED LISTENING TESTS

JANUARY 1992

AND

APRIL 1993

SELECTED TAPE RECORDINGS OF LISTENING TESTS

Tape recordings of AM radio station reception were taken during daylight hours[1/] at a rural location near Lucketts, Loudoun County, Virginia (Site No. 1 on the attached map) using a Potomac Instruments, Type SMR-11 stereo receiver which meets NRSC voluntary receiver standards and a Tascam, Type 122 professional cassette tape recorder.

The attached tape recordings were taken on Class B radio stations WGMS, 570 kHz, WFMD, 930 kHz; and WMZQ, 1390 kHz. WGMS and WFMD monitoring was performed on November 30, 1991 and WMZQ monitoring was performed on December 7, 1991. During the taping, various electrical items were turned on as follows:

Tone Code	Electrical Item
-	Video Cassette Recorder
--	TV Receiver
---	Compact Fluorescent Lights
----	Standard Fluorescent Lights
-----	SCR Dimmed Light

Field strength measurements were taken of each station at the time of program recording using a Potomac Instruments, Type FIM-41 field strength meter. Field strength measurements of pertinent adjacent-channel stations were also taken with the field meter oriented toward the station being recorded. Since the Potomac Instruments receiver utilizes an amplified ferrite rod antenna, field strength values measured as described will approximate the adjacent channel signal station at the receiver. Measured field strength are as follows:

[1/]During the period two hours after sunrise until two hours before sunset.

Relative Frequency	MEASURED FIELD STRENGTHS		
	WGMS	WFMD	WMZQ
	mV/m	mV/m	mV/m
-3 adjacent	0.045 to 0.105	0.033	0.16
-2 adjacent	0.110	0.06 to 0.10	0.021
-1 adjacent	0.185	Unmeasurable	0.14
co-channel	1.45	5.6	0.51
+1 adjacent	0.09 to 0.10	0.06	0.16
+2 adjacent	0.19 to 0.21	1.2	0.10
+3 adjacent	0.075	0.10 to 0.12	0.02 to 0.04

Additional tape recordings were taken on WMZQ (AM and FM) at three locations from the Cohen, Dippell and Everist, P.C. field truck in Loudoun County adjacent to Virginia Route 7 on January 11, 1992, using a Sony portable FM/AM stereo receiver, Type SRF-A100 and a Radio Systems Inc., Type RS-1000 professional DAT machine. Associated field strength measurements of pertinent frequencies were taken using Potomac field strength meters, Type FIM-21 and FIM-71 at the following sites:

Site	Description
2. Hamilton	Opposite gray barn, Route 704 and Irene Avenue
3. Leesburg	Parking lot in front of Giant supermarket, north side of Route 7
4. Ashburn	Ashburn Village Boulevard, 200 feet south of Route 7.

At each site, recordings were made in the following sequence:

Song Number One

(a)	WMZQ AM	Mono	Wideband
(b)	WMZQ AM	Stereo	Wideband
(c)	WMZQ FM	Stereo	---

Song Number Two

(d)	WMZQ FM	Stereo	---
(e)	WMZQ AM	Stereo	Normal Bandwidth
(f)	WMZQ AM	Mono	Normal Bandwidth

Field strength values were taken at each site. The average of probing of FM field strength readings taken at seven feet above ground level were computed in accordance with the